DYNAMIC ROUTE DISCOVERY FOR OPTICAL SWITCHED NETWORKS USING PEER ROUTING

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is related to U.S. Patent Application No. 10/126,091, filed April 17, 2002; U.S. Patent Application No. 10/183,111, filed June 25, 2002; U. S. Patent Application No. 10/328,571, filed December 24, 2002; U.S. Patent Application No. 10/377,312 filed February 28, 2003; U.S. Patent Application No. 10/377,580 filed February 28, 2003; U.S. Patent Application No. 10/417,823 filed April 16, 2003; U.S. Patent Application No. 10/417,487 filed April 17, 2003; U.S. Patent Application No. (~~Attorney Docket No. 42P16183~~) filed May 19, 2003, U.S. Patent Application No. (~~Attorney Docket No. 42P16552~~) filed June 18, 2003, U.S. Patent Application No. (~~Attorney Docket No. 42P16847~~) filed June 24, 2003, U.S. Patent Application No. (~~Attorney Docket No. 42P17373~~) filed August 6, 2003, and U.S. Patent Application No. (~~Attorney Docket No. 42P17541~~) filed October 22, 2003.

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FIELD OF THE INVENTION

[0002] Embodiments of the present invention relate to optical networks in general; and, more specifically, to techniques for dynamic route discovery for optical-switched networks.

BACKGROUND INFORMATION

[0003] Transmission bandwidth demands in telecommunication networks (*e.g.*, the Internet) appear to be ever increasing and solutions are being sought to support this bandwidth demand. One solution to this problem is to use fiber-optic networks, where wavelength-division-

proposed label and selecting its own label. In general, a label list can also be proposed by an edge or switching node to its downstream switching node. This component can advantageously increase the speed of control channel context retrieval (by performing a pre-established label look-up instead of having to recover a full context). Further details of label configuration and usage are discussed in co-pending U.S. Patent Application No. (~~Attorney Docket No. 42P16847~~ 10/606,323).

[0059] To enable PBS networking within hop and span-constrained networks, such as enterprise networks and the like, it is advantageous to extend the GMPLS-based protocols suite to recognize the PBS optical interfaces at both ingress/egress nodes and switching nodes. Under the GMPLS-based framework, the PBS MAC layer is tailored to perform the different PBS operations while still incorporating the MPLS-based traffic engineering features and functions for control burst switching of coarse-grain (from seconds to days or longer) optical flows established using a reservation protocol and represented by a PBS label.

[0060] In important aspect of the present invention pertains to label signaling, whereby coarse-grain lightpaths are signaled end-to-end and assigned a unique PBS label. The PBS label has only lightpath segment significance and not end-to-end significance. In exemplary PBS label format 500 is shown in Figure 5 with its corresponding fields, further details of which are discussed below. The signaling of PBS labels for lightpath set-up, tear down, and maintenance is done through an extension of IETF (Internet Engineering Task Force) Resource Reservation Protocol-Traffic Engineering (RSVP-TE). More information on GMPLS signaling with RSVP-TE extensions can be found at http://www.ietf.org/rf/rfc3473.txt.

[0061] The PBS label, which identifies the data burst input fiber, wavelength, and lightpath segment, optical channel spacing, is used on the control path to enable one to make soft